

Alp Sayin

Antalya, Turkey

alpsayin [at] gmail [dot] com

+44(0)7584169547/+90(0)5366492302

Radar Engineer with Embedded Systems expertise with 2 years of postdoc and 8 years of R&D Experience

Currently, I'm a radar engineer with an interest in MIMO and Synthetic Aperture radars with signal processing focus. I am also an expert in embedded systems in which I have extensive practice in designing and delivering hardware and software all together. Apart from my work I'm passionate about skydiving, swimming and skiing.

Education

- **PhD.** Microwave Integrated Systems Laboratory, EESE, University of Birmingham, UK 10/2013 – 9/2017
- **MSc.** System-on-Chip Design, Royal Institute of Technology, Stockholm, SWEDEN 8/2010 - 5/2013
- **BSc.** Honours Electrical and Electronics Engineering, Bilkent University, Ankara, TURKEY 8/2006 - 6/2010
- Middle East Technical University Development Foundation Private High School, Ankara, TURKEY 8/2003 - 6/2006

Work Experience

Research Fellow, Microwave Integrated Systems Laboratory (MISL) 9/2016-12/2018
Development of radar systems, hardware design & implementation, signal processing algorithm development, modelling & simulation, planning & conducting trials, data processing, documentation & presentation of results to stakeholders, project planning & managing, and managing students

System Engineer/Founder, Nocta Technologies 6/2012 - 9/2013
System design, project management, task distribution, firmware development, client software implementation, running simulations, testing, documentation and presentation of progress to stakeholders, general research & development activities. Company was awarded a grant by Turkish Ministry of Science, Industry & Technology.

Embedded Software Developer, Inturlam Bilisim 6/2011 - 9/2011
System design, project management, embedded software development, low-level comms protocol development & implementation, PC software design & development, testing & verification, working with the hardware group

Projects

PASSAT II - Passive micro-satellite based Spaceborne Synthetic Aperture Radar (SAR) 9/2017 - 9/2018
I have successfully planned and conducted ground and airborne trials for this project and made the first breakthrough in the data processing. I have vastly improved the performance of our processing by means of code optimisation and algorithm improvement. I overtook the repackaging of our equipment and slashed nearly half the size. I also achieved to define arbitrary geodetic coordinate grids for processing instead of relying on local coordinates. While also supervising a PhD student, regularly I document and present our findings to the stakeholders (University of Surrey, DSTL).

SPYGLASS - Galileo-based passive Radar System for Maritime Surveillance 7/2017-11/2017
I have taken over this project during its final months for knowledge transfer purposes. I have studied 6 years' worth of R&D and created tutorials on how to execute processing and produced results. I prepared presentations on results obtained. I also planned and conducted a new set of trials. I also taught and managed an MSc student to do processing on unprocessed data. Results I produced were presented to stakeholders (NATO).

SIMITAR II - Persistent surveillance from air with a low frequency MIMO towed array radar 9/2016 - 6/2017
I have successfully developed beamforming algorithms for correcting tow-deviations. I then took the algorithm further ahead with Doppler processing for moving target indicators and also achieved beam based perfect platform motion compensation for enhanced target localisation. I planned and conducted lab and outdoor trials for algorithm verification. As an output I've documented and presented the outcomes to the stakeholders (QinetiQ/Airbus, DSTL).

MIMO Sensor Array Optimisation for Short-Range High-Resolution Automotive Sensing 10/2013 - 6/2016
I have built a MIMO array radar with only an oscilloscope, a waveform generator and simple RF components. I have successfully conducted experiments to verify MIMO radar theory and developed a near-field MIMO beamforming algorithm. After verification, I switched to acoustic waves and built an ultrasonic MIMO sonar from scratch. I designed and built transmitter and receiver PCBs and 3D printed a housing. After verification, I have implemented heuristic optimization

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algorithms to obtain more performance out of MIMO sensor arrays and achieved 35% performance improvement. In the meantime, I have periodically documented my progress and presented my work to stakeholders (Jaguar Land Rover).

Centralised Swarm AI system for MavLink enabled Unmanned Vehicles 6/2012 - 9/2013

I have been the technical manager for this project and therefore did the entire development plan and distributed tasks to the rest of the team. I oversaw the built of drones and conducted initial flight trials. I have integrated small Linux computers (RPI) onto quadcopters and interfaced them through serial port. I have written the drone software and the centralised command-line client in python. Finally, I successfully ran software-in-loop simulations of a 3-drone system using virtual machines and demonstrated our product to stakeholders (Turkish Ministry of Industry and Science).

VHF/UHF Uplink Solutions for Remote Wireless Sensor Networks 2/2012-12/2012

As part of my MSc, I have implemented Internet Protocol over radio modems with complete protocol stack layers using 802.15.4/AX.25/IP/UDP/TFTP. I have implemented this solution with C for a Linux machine, and also successfully ported it for ContikiOS using processes. Finally, I designed PCBs for the radio modems and built an uplink solution with plug-and-play functionality. I have released all the output on Github and on my personal server for WSN community to use.

Porting of TinyOS to Atmega128Rfa1 9/2011-1/2012

As part of my MSc, we ported TinyOS to an MCU with a built-in low-power IEEE 802.15.4 radio module. I took the design lead in this project and managed the tasks. Project involved porting of low-level libraries, development of a wireless sensor network application in nesC, implementation of a gateway program in C in Linux environment and documentation. My main task was the implementation of low-level drivers for TinyOS hardware and platform abstraction, I also helped build the sensor network application in nesC, and wrote the C program that receives the data and compiles it into an HTML file hosted in a Linux machine. I also developed the gateway comms protocol. The port is hosted on my Github.

Remote Pipe Observation System 6/2011 - 9/2011

I have designed a bespoke IoT embedded system capable of monitoring flow, pressure and temperature parameters of a pipe. As the lead in this project, I was also the point of contact for taking client's requirements and interpreting them into technical specifications and giving updates. As lead, I also chose the sensors and microcontrollers to be used and tasked a hardware specialist to assemble it on a PCB and build, while I have successfully implemented the embedded firmware using mBed and developed PC software using Java which communicated with the device via a REST API over Ethernet.

Technical Experience

- Remote Sensing: MIMO Radar, Phased Array, Digital Beamforming, SAR, MTI, Doppler, Passive Bistatic, Airborne and Spaceborne, Sonar, Ultrasonic Sensing, Signal Processing, RF front-end, Automotive, Surveillance, Defence
- Embedded Systems: Hardware design, PCB design, Embedded hardware, Embedded software, Multi-core programming, FPGA programming, Low-level communications (RS232, I2C, Ethernet etc.), Wireless Sensor Networks, Network Applications, Client/Server programming, IoT (Internet of Things), mBed, FreeRTOS, uC/OS, TinyOS, Contiki-OS
- Other: System Design, Algorithm Development, Heuristics, Software Optimisation, Software Development, Project Planning and Management, Knowledge Transfer, Risk Assessment, Time Management
- Languages: MATLAB, Python, C/C++, Java, VHDL, Bash, Unix, Assembly, HTML, CSS, Javascript
- Environments: MATLAB, NI LabView, Eclipse, Quartus, Xilinx ISE, Modelsim, Gpl-Eda, Netbeans, Proteus, Git, Linux

Other

- Committee Member and Advisor for University of Birmingham Skydiving Society 10/2016 – Current
- Trained with the University of Birmingham Triathlon Team 9/2016 – 9/2018
- Founding member and Secretary of University of Birmingham Drone Society 6/2016 – 8/2017
- Languages: Turkish (Native), English (C2)
- LinkedIn: <https://www.linkedin.com/in/alpsayin>